Exports of Crude Oil in 1986

National Energy Board
April 1987

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Introduction

Effective June 1, 1985, licensing and charging of oil exports ended. The Board now issues export orders, available on request to both Canadian and foreign companies. These orders specify neither volumes nor prices and cover an exportation period of up to one year in the case of light crude oil and up to two years in the case of heavy crude oil. The Board has assumed a monitoring role with respect to export prices and volumes, which are reported to it by the exporters each month.

This report provides a review of the volumes and prices associated with the supply and disposition of Canadian crude oil during 1986. The Board published a similar review in November 1986 covering the period June 1, 1985 to May 31, 1986 and because the previous report covered part of the 1986 period some of the comments and analysis included in the earlier report were found to be equally applicable in this review.

Highlights

- The collapse in world oil prices, which followed OPEC's December 1985 decision not to restrict production, bottomed in late March of 1986. Prices did not regain significant ground until OPEC agreed to re-institute production quotas commencing 1 September. Prices increased further after OPEC's December meeting when it decided to reduce individual countries' production levels and restore official pricing effective 1 February, 1987 (page 1).

- The posted price of the "Canadian Par Crude", when delivered to Chicago, tracked the path of spot WTI during 1986 and averaged about $U.S. 16.85 per barrel, approximately $U.S. 0.25 per barrel more than the average for WTI (page 2).

- In contrast to Canadian posted prices, and reflecting the difficult and volatile marketing environment during the past year, the realizations obtained for light Canadian crude oil in the Chicago market were closer to the low end of the range of spot prices for WTI on a quality adjusted basis (page 3).

- For heavy crude oil exports to Chicago, Mexican Maya is the most significant measure of the competition. The prices obtained for exports, particularly during the period of the price collapse, tended to be slightly lower than the price of Maya, which enabled Canadian sales volumes to be maintained at relatively high levels (page 4).

- The productive capacity of light crude oil and equivalent declined during the year by about 4 percent to 196.6 $10^3m^3/d$; that of heavy crude oil increased by 20 percent to 68.2 $10^3m^3/d$ (pages 7 and 10).

- Export volumes of light crude oil increased by 23 percent to average 41.2 $10^3m^3/d$ in 1986 of which supplemental sales accounted for 6.1 $10^3m^3/d$. The first shipment of commercial production from the Beaufort Sea was made to a far east destination (page 9).

- Export volumes of heavy crude oil continued to rise in 1986 in line with higher production and averaged 52.3 $10^3m^3/d$, an increase of 10.3 $10^3m^3/d$ (page 10).

- Imports of crude oil were 46.0 $10^3m^3/d$, about 12 percent above the 1985 level. Imports from the North Sea represented 54 percent of the total (page 12).

Export Prices

International Market Environment

In December 1985, OPEC changed its long-standing policy of attempting to maintain official prices by limiting production. Under the new strategy, the group decided to "secure and defend for OPEC a fair share in the world oil market", even though it recognized that this could trigger a price war. The result was a collapse in international oil prices. Benchmark West Texas Intermediate (WTI), for example, fell from a high of nearly $U.S. 32.00 per barrel in late 1985 to about $U.S. 10.50 per barrel in March 1986.

Following the drop in world oil prices, OPEC Ministers held six meetings during 1986 to discuss various strategies for strengthening the market. These are summarized below.

- At the mid-March meeting, although Ministers agreed upon the need to reduce production, they could not reach a compromise concerning the allocation of quotas to individual members.

- The group was divided at the April session with Iran, Libya and Algeria promoting large, quick reductions in production while the other OPEC members preferred a more gradual approach.

- The June gathering again concluded without a consensus, although a majority of the members backed a plan to limit total annual output to 17.6 million barrels per day. During the first eight months of 1986, OPEC production occasionally exceeded 20 million barrels per day.

- The conference held in Geneva during July produced an agreement whereby, for two months commencing September 1986, member countries, except Iraq, opted to return to the quota levels existing in late 1984. Iraq was permitted to produce at any level. OPEC's quota, therefore, was about 16.8 million barrels per day for the period of the agreement, given Iraq's August production of nearly 2.0 million barrels per day.

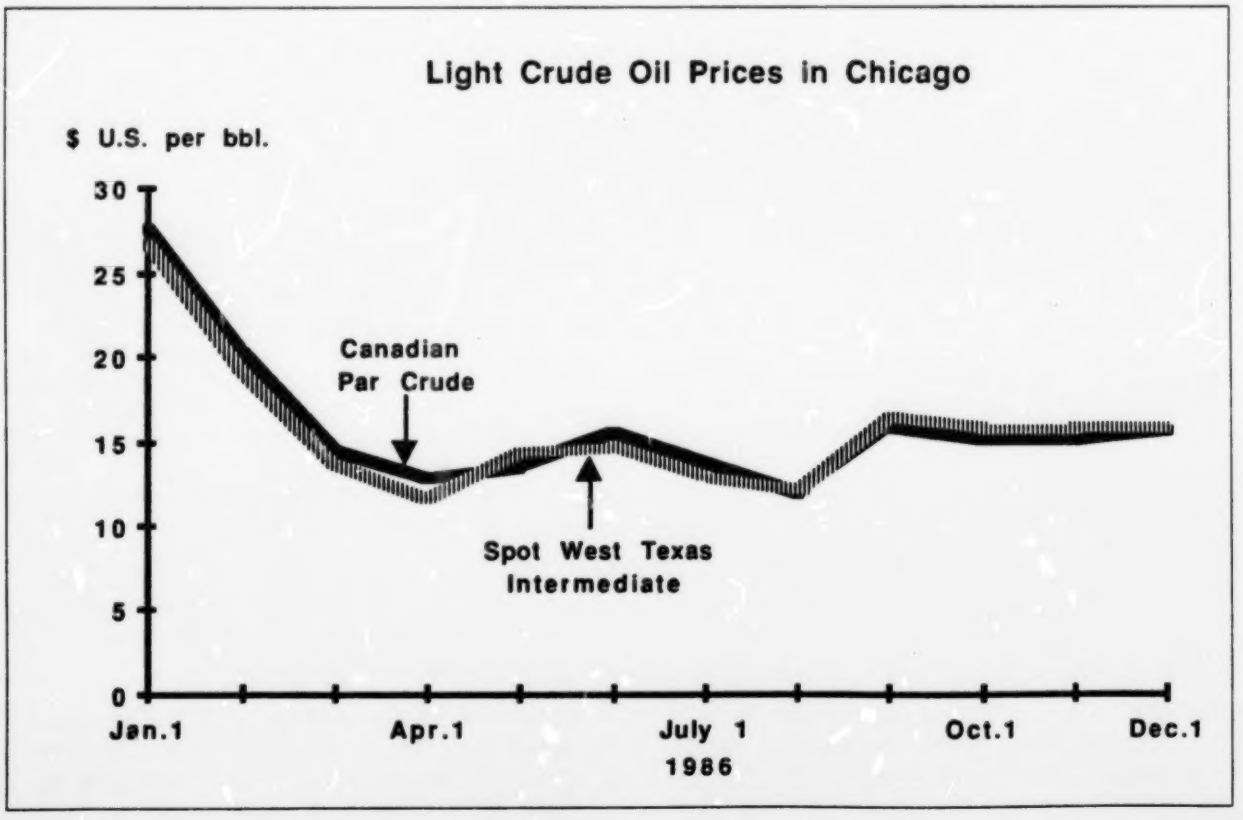
- In October, OPEC agreed to increase the overall quota slightly for November and December, to an average level of 17.0 million barrels per day.

- When the Organization met in December, it decided to extend the quota system into 1987, at a reduced level of 15.8 million barrels per day for the first half of the year. It also agreed to return to official or fixed pricing by 1 February 1987, and to establish a reference price based on a basket of seven crudes (six OPEC and one non-OPEC) at a targeted level of $U.S. 18.00 per barrel.

Canadian Crude Oil Posted Prices

The following graph compares the posted price of the light Canadian Par crude prevailing on the first day of each month with the spot price of WTI, both expressed at Chicago. These two crude oils are essentially the same quality. The Par posting tracked the path of spot WTI during 1986 and averaged about $U.S. 16.85 per barrel, approximately $U.S. 0.25 per barrel more than the average for WTI.

For heavy crude oils, the prices of such competing feedstocks as Mexican Maya and Wyoming Sour



were instrumental in establishing the posted prices of equivalent Canadian oils.

Review of Export Prices

The National Energy Board monitors Canadian crude oil export realizations by establishing, for each major market, a range in the prices of key competing crude oils. These yardsticks form the basis for the review of Canadian pricing performance.

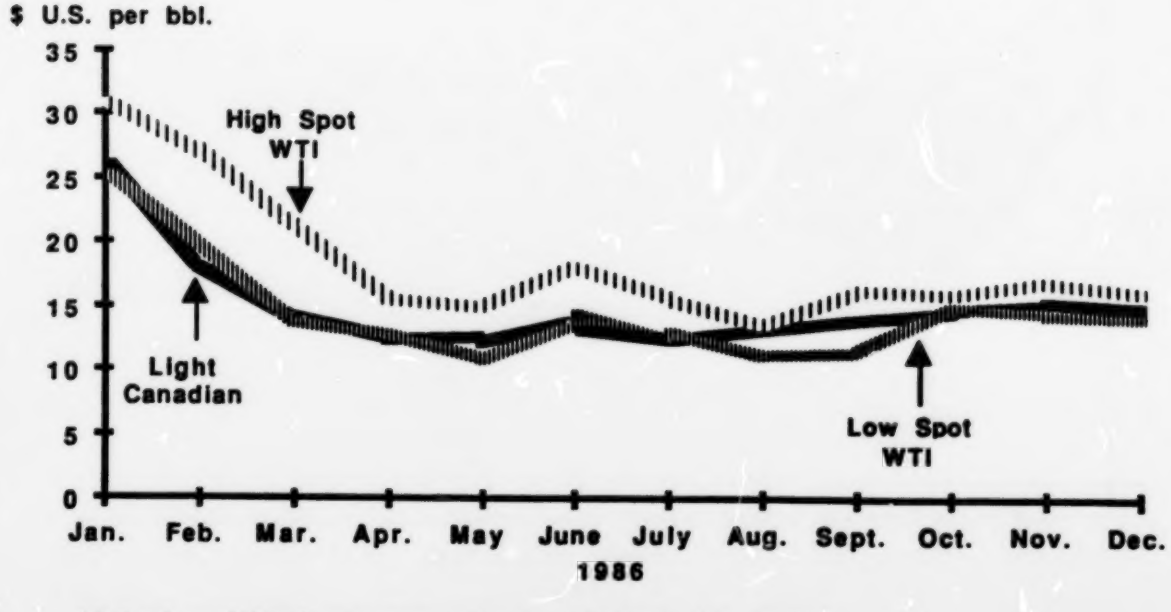
It should be kept in mind that foreign buyers generally view light Canadian crude oil as a marginal source of supply. The result is that those exports must be priced to compete with other spot supplies in international markets which, at times during 1986, were extremely volatile. Most heavy Canadian exports, on the other hand, are not seen as the marginal supply and, consequently, their prices tended to be less volatile than those for light crude oils.

The confidential nature of the pricing data supplied to the Board by individual companies precludes a market-by-market review for publication. For Chicago, however, sufficient transactions took place to enable it to be used as an indicator of the performance of light and heavy Canadian crude oils. As well, we are able to comment on the estimated weighted average export prices for all light crudes and for all heavy crudes relative to the prices received for sales in Chicago, on a netback basis. Moreover, an analysis can be undertaken to compare export prices with the costs incurred by Canadian refiners for domestic supplies and for imports.

Light Crude Oils - Chicago

Crude oils from a multitude of sources, both foreign and domestic, compete in the Chicago market. Because of the direct link between Chicago and the U.S. Gulf (one of the world's most competitive spot markets), price changes are felt quickly in Chicago.

Weighted Average Delivered Price of Light Canadian Crude Oil Exports* Versus Spot Price of WTI, at Chicago



*Actual weighted average prices, adjusted for quality

Generally, prices for light Canadian crude oil exports are assessed at Chicago against, among others, the high and low spot prices for WTI. Estimated landed costs for North Sea feedstocks are also considered because of their influence on WTI prices.

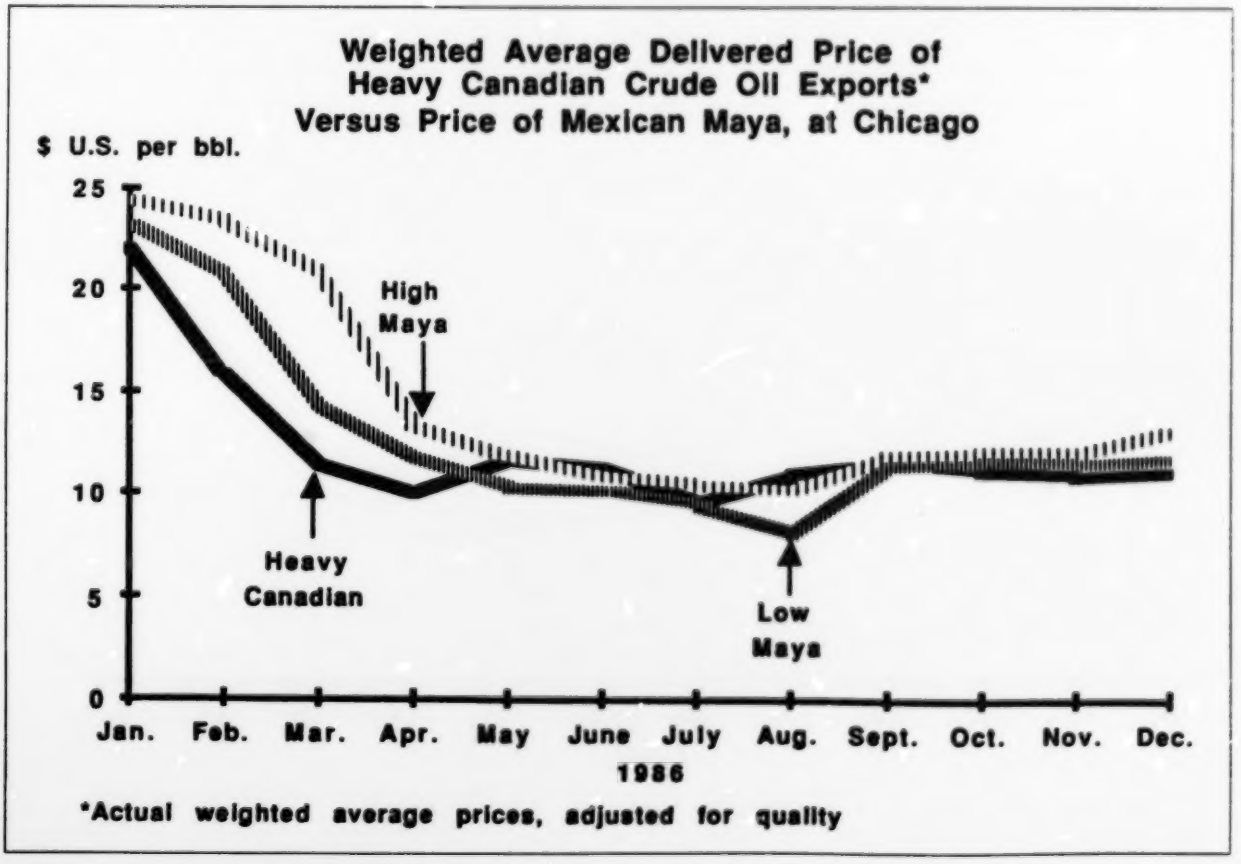
The graph on page 3 compares the weighted average monthly prices of light Canadian crude oil exports at Chicago, on a quality-adjusted basis, with the high and low spot WTI prices. The realizations obtained for light Canadian feedstocks were closer to the low (rather than the high) end of the price range. This reflected the realities of an extremely difficult and volatile marketing environment during the past year.

Heavy Crude Oils - Chicago

For heavy Canadian crude oil exports to Chicago, Mexican Maya is one significant measure of the competition. In January, 1986, Mexico's policy of regularly setting official prices before crude was produced was replaced with a system of retroactive pricing. Customer dissatisfaction with the retroactive arrangement prompted the Mexicans, in February, to implement pricing formulae for each of three geographical regions based on competing prices in a particular market. For U.S. markets, the formula was a function of the spot prices for WTI, West Texas Sour, Alaskan North Slope and heavy fuel oil. Initially, the formula for Maya was not sufficiently market-oriented, which necessitated adjustments to it to lower the price.

During the period of the price collapse, the prices of heavy Canadian crude oils tended to be more market-oriented than the Maya price. This enabled Canadian sales volumes to be maintained at high levels, while Mexico's exports declined sharply. By the second quarter, however, Maya prices at Chicago were more in line with the prices for Canadian heavy crudes. This was the result of the bottoming out of prices and the realigning of the Mexican pricing formula to make it more market-responsive.

The following graph compares the monthly weighted average price of heavy Canadian crudes



at Chicago with the estimated monthly high and low prices of Maya.

Light and Heavy Crude Oils - All Markets

The two graphs on the following page illustrate, on a monthly basis, the weighted average estimated netback prices for all light Canadian crude oil exports at Edmonton and for all heavy exports at Hardisty, compared with those netbacks based solely on exports to Chicago. The composite netbacks for all light crude oils are somewhat higher than those for Chicago during periods of falling prices because, as mentioned previously, changes in price are felt more quickly in Chicago than in the other markets. For the same reason, prices in Chicago tend to be higher than the composite during periods of rising prices. In the case of heavy crude oils, the composite netback prices do not differ significantly from those at Chicago, reflecting the somewhat less erratic nature of the heavy crude oil market.

Comparison of Export Prices with the Costs of Domestic Deliveries and Imports

As part of its monitoring process, the Board compares the prices received for Canadian crude oils delivered to export markets with the costs incurred by Canadian refiners for domestic and for imported supplies. In this connection, the table below shows, for 1986, the weighted average refinery acquisition cost data for light crude oils. (The same type of analysis for heavy crude oils would not be as meaningful because relatively small amounts of this grade of feedstock are used in Canada, primarily for asphalt production in the summer).

It appears that, for 1986 as a whole, Canadian refiners paid somewhat more than U.S. refiners for light Canadian crude oils (about $U.S. 0.65 per barrel, or 4 percent). Canadian refiners, however, paid less for domestic supplies than for imports (approximately $U.S. 0.70 per barrel, or 4 percent).

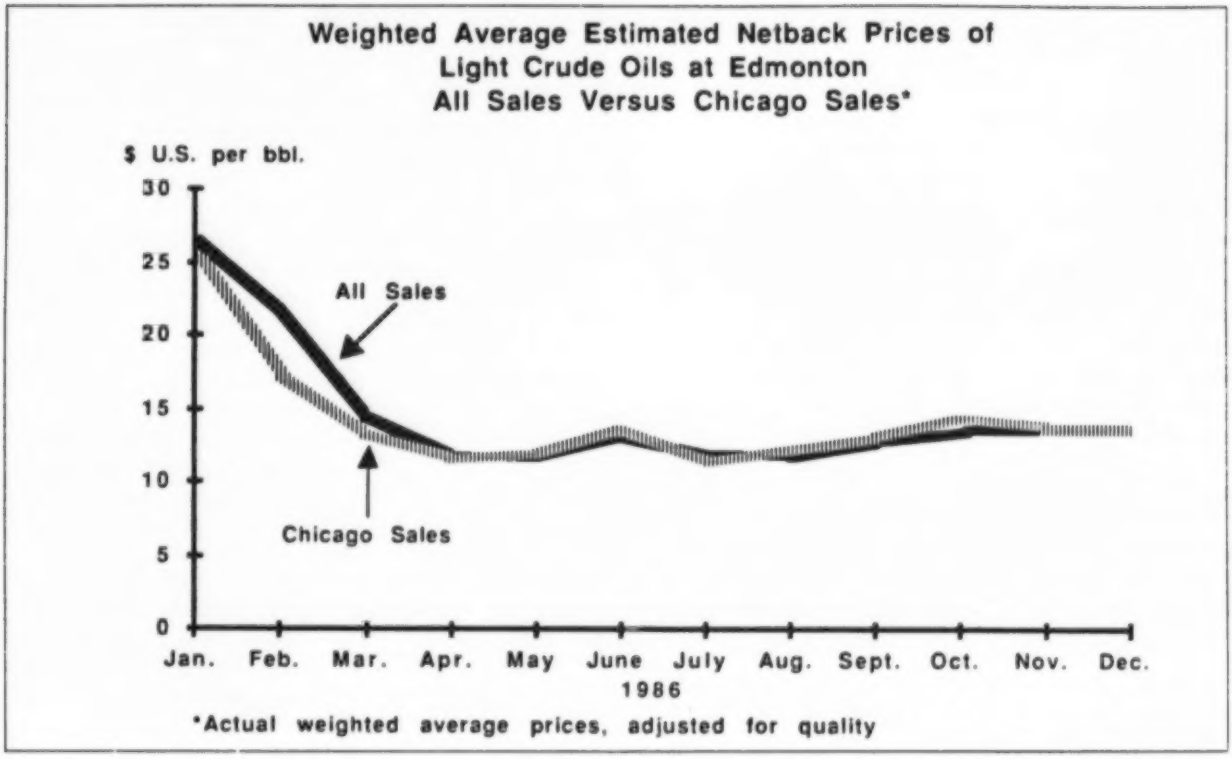
In order to eliminate distortions arising from such factors as differences in transportation costs and import fees, the comparative analysis should be undertaken at a common point of origin. On such an adjusted basis, the difference of about $U.S. 0.65 per barrel between the costs paid by U.S. and Canadian refiners for Canadian supplies becomes roughly $U.S. 1.25 per barrel. It was not feasible, however, to similarly adjust the imports, because the prices for some of these cannot be determined in western Canada.

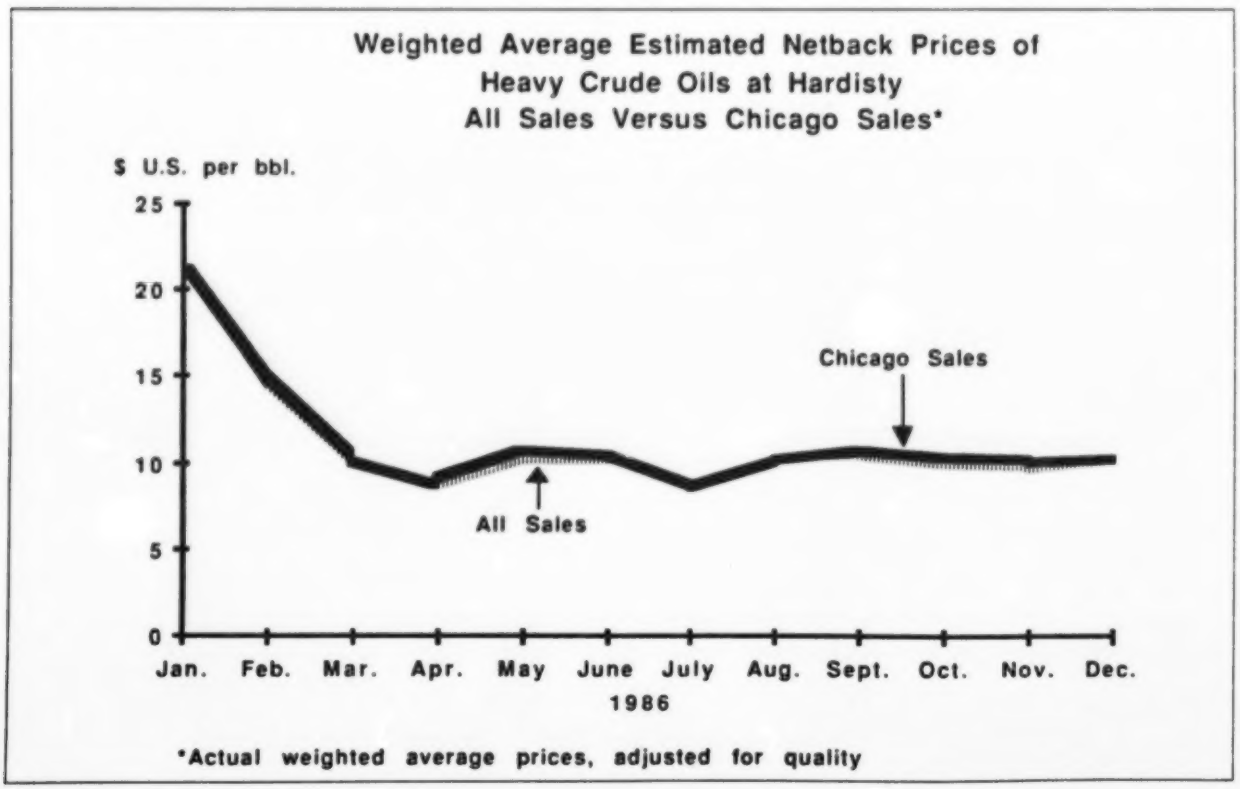
A major factor contributing to the spread between the costs incurred by U.S. and Canadian refiners for light Canadian feedstocks is the different pricing practices used to sell crude oil in the domestic and export markets. In general, refiners pay monthly average posted prices in Canada. To

1986 Refinery Acquisition Costs *
($U.S. per barrel)

	Canadian Crude Used by U.S. Refineries	Canadian Crude Used by Canadian Refineries	Imported Crude Used by Canadian Refineries
January	27.53	25.70	27.58
February	22.64	21.36	24.75
March	15.42	16.60	17.52
April	12.60	13.63	14.37
May	12.61	13.57	14.96
June	14.10	13.71	14.44
July	12.87	12.57	12.91
August	12.83	13.33	12.51
September	13.87	14.21	13.54
October	14.61	14.49	14.97
November	14.58	14.51	14.72
December	14.61	14.87	15.53
Total 1986	**15.10**	**15.77**	**16.47**

* Quality adjusted to 38° API.


Weighted Average Estimated Netback Prices of
Light Crude Oils at Edmonton
All Sales Versus Chicago Sales*
$ U.S. per bbl.
30
25
20
15
10
5
0
All Sales
Chicago Sales
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
1986
*Actual weighted average prices, adjusted for quality


Weighted Average Estimated Netback Prices of
Heavy Crude Oils at Hardisty
All Sales Versus Chicago Sales*
$ U.S. per bbl.
25
20
15
10
5
0
Chicago Sales
All Sales
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
1986
*Actual weighted average prices, adjusted for quality

ensure sales in the export market, however, the selling price typically has to be discounted, reflecting the pressures of a spot market environment. The higher cost of imports relative to the prices paid by Canadian refiners for domestic crude oils is partially attributable to lower transportation costs for the domestic deliveries and the longer transit time for foreign crudes which, in a falling market, results in delays in the realization of lower prices.

Supplemental Sales

From time to time in 1986, Alberta light crude oil was shut-in despite the fact that export markets were available for some of it and there was pipeline capacity to reach those markets. To assist Alberta producers in marketing "supplemental production", the Alberta Energy Resources Conservation Board implemented the Supplementary Crude Oil Sale Program commencing October 1985. The program allowed buyers to access crude oil for export only. The realizations from these "supplemental sales" were generally below the average price paid by Canadian buyers of domestic crude oil. Based on the prices received for individual supplemental sales, the difference was as much as $U.S. 4.00 per barrel during the price collapse. When prices were less volatile, however, the difference dropped to roughly $U.S. 2.00 per barrel. This reflected the market situation for marginal sales, primarily in Montana and Washington states.

Export Volumes

Western Canadian Light Crude Oil and Equivalent

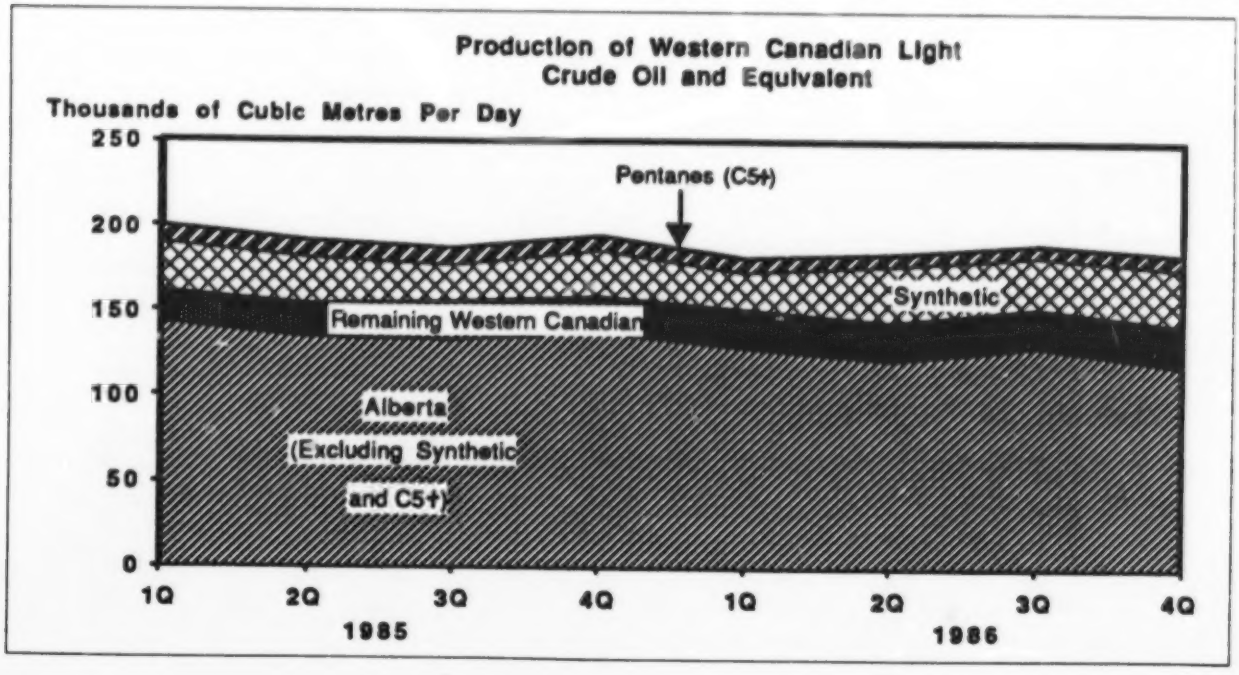
Productive Capacity

The productive capacity of western Canadian light crude oil and equivalent continued to decline in 1986 and averaged some 196.6 $10^3m^3/d$, a decrease of 7.1 $10^3m^3/d$, or about 4 percent, from 1985. New additions did not offset the natural decline in producing reservoirs and the large decrease in crude oil prices which began in the first quarter of 1986 significantly reduced exploration and development throughout the year.

Production

The following graph depicts the production of western Canadian light crude oil and equivalent during 1985 and 1986.

Despite low crude oil prices and labour disputes, synthetic crude oil achieved a record level of production in 1986. Output from both plants



averaged 29.2 $10^3m^3/d$ in 1986, a 12 percent increase from 1985. However, during the same period conventional production declined by 6 percent to 149.0 $10^3m^3/d$. With pentanes plus remaining fairly constant this resulted in a total production of light crude oil and equivalent of 186.0 $10^3m^3/d$, a decline of 4 percent from the level achieved in 1985.

This decline was due in part to the inability of the pipelines to maintain their 1985 level of light crude oil deliveries in the face of increased movements of heavy crude oil. Furthermore, some wells were shut in following the price collapse.

Disposition

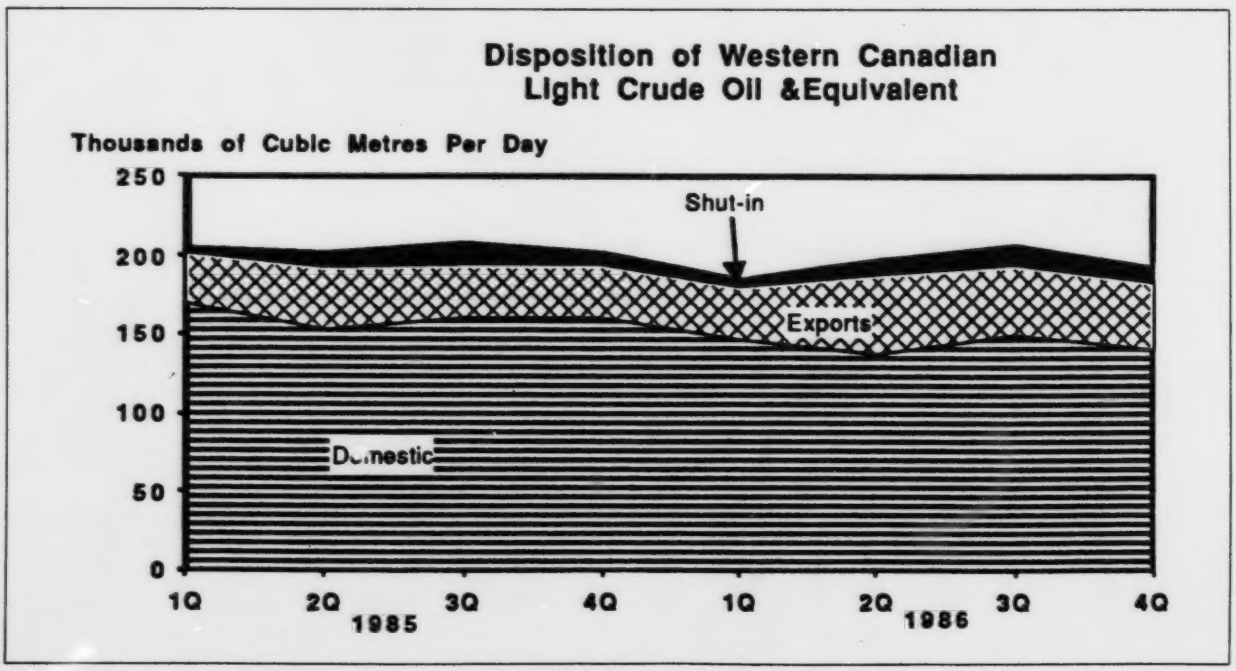
The graph below shows the disposition of western Canadian light crude oil and equivalent during 1985 and 1986.

Domestic Market

In 1986, Canadian refiners' receipts of western Canadian light crude oil and equivalent were 144.6 $10^3m^3/d$, 11 percent below the 1985 level. The termination of the Domestic Crude Oil Transfer Program on June 1, 1985 dramatically changed the economic logistics for Canadian feedstocks. Western Canadian producers penetrated the U.S. Northern Tier market even further in response to reduced liftings by refiners east of Ontario. No deliveries were made to Atlantic refiners. Deliveries of light crude oil to Quebec declined in 1986 by almost 40 percent to 13.2 $10^3m^3/d$.

Capacity problems on the Interprovincial Pipe Line system and the partial relaxation of crude oil exports by the U.S. government* resulted in some Ontario refiners importing U.S. crude oil. In addition, the decline in domestic product demand and favourable economics for importation of offshore feedstocks affected refiners' requirements for Canadian light crude oil. The closure of Gulf's Montreal refinery in February 1986 provided a further dampening effect on the demand for Canadian crude oil. The requirements by refiners in the Prairies and British Columbia for light Canadian crude oil did not vary greatly during 1986 compared to 1985. The decline in the second quarter of each year primarily reflects refinery turnarounds.

* Crude oil exports from the Alaskan North Slope and U.S. Naval Petroleum Reserves are still prohibited.



The table below sets out the disposition of western Canadian light crude oil and equivalent by region in Canada and by market in the United States during 1985 and 1986.

Export Market

The lack of pipeline capacity to move surplus light crude frustrated attempts to fully satisfy the requirements of the Nothern Tier refiners. At times, competitive pricing of alternative crude oils in U.S. markets, particularly in the Pacific north-west, also prevented Canadian producers from selling all their output.

Exports of light crude oil, however, did increase in 1986 by some 23 percent to an average of 41.2 $10^3m^3/d$. These exports represented about 22 percent of total light crude oil and equivalent production, the highest since 1976. In 1986, the U.S. Northern Tier, particularly the Chicago area, continued to be the prime export market for light Canadian crude oil. This market absorbed 27 percent of Canada's light crude oil exports, closely followed by Toledo, Ohio at 23 percent and Warren, Pennsylvania at about 18 percent.

The Puget Sound area continued to provide an outlet for supplemental sales which could not move east on IPL because of a lack of pipeline capacity. Exports of supplemental crude oil in 1986 were 6.1 $10^3m^3/d$ or 15 percent of total light crude oil exports. The year also witnessed the first shipment of commercial production from the Beaufort Sea which was exported to a far east destination.

Appendix I provides details of the exports of light crude oil by consignee during 1985 and 1986.

Disposition of Western Canadian Light Crude Oil and Equivalent
($10^3m^3/d$)

	1985	1986
Domestic		
Northwest Territories	0.5	0.5
British Columbia	22.8	20.8
Prairies	48.0	47.6
Ontario	67.6	62.5
Quebec	21.6	13.2
Atlantic	2.3	–
Sub Total	**162.8**	**144.6**
Export		
Puget Sound, Washington	2.1	3.8
Billings/Laurel, Montana	1.7	5.8
Twin Cities, Minnesota	2.3	1.5
Chicago, Illinois	11.7	11.1
Toledo, Ohio	3.6	9.3
Warren, Pennsylvania	6.3	7.4
Other	5.7	2.3
Sub Total	**33.4**	**41.2**
Total	**196.2**	**185.8**
Shut-In	10.0	10.7

Western Canadian Heavy Crude Oil

Productive Capacity

The productive capacity of heavy crude oil during 1986 averaged 68.2 $10^3m^3/d$, an increase of 20 percent from 1985. This primarily reflects increased productive capacity in some conventional producing areas (i.e. Lloydminster and Bow River) as well as non-conventional bitumen production from the Cold Lake region of Alberta.

Production

The graph below illustrates the actual production of Canadian heavy crude oil, including diluent, during 1985 and 1986.

Output of heavy crude oil continued to rise in 1986 and peaked at 69.6 $10^3m^3/d$ in December. Average production for the year was 64.3 $10^3m^3/d$. The increase of about 17 percent over 1985 occurred primarily in Alberta. Output would have been even higher in both provinces had not crude oil prices collapsed earlier in the year. The rapid decline in prices resulted in some wells being shut in.

Disposition

The graph on the next page shows the demand for western Canadian heavy crude oil during the last two years.

Domestic Market

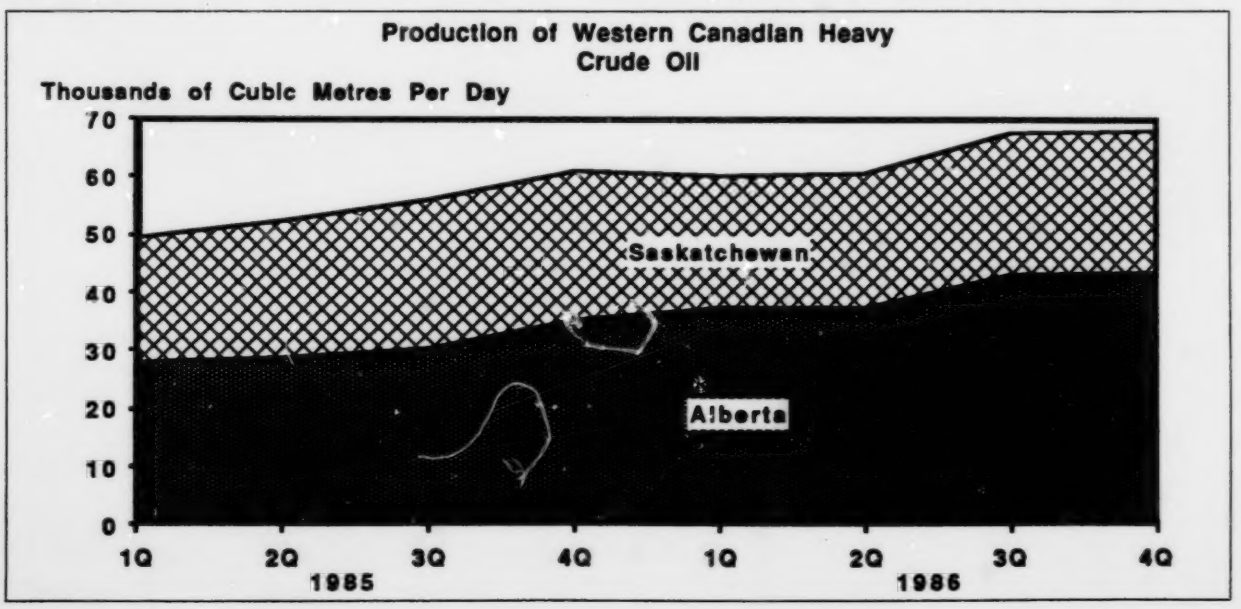
Receipts of domestic heavy crude oil at Canadian refineries in 1986 equalled the 1985 level of about 14.2 $10^3m^3/d$.

In the past, the price differential between light and heavy crude oil did not justify upgrading refinery facilities to convert heavy crude to light products. As a result, the Canadian refining industry has historically used heavy crude oil primarily for the production of asphalt although a small portion is used for the manufacture of other petroleum products. The pattern of heavy crude liftings by domestic refiners displayed the traditional summer peaking in 1985 but this did not occur in 1986 as refiners began lifting rateably in order to ensure an adequate supply of heavy crude for the asphalt season.

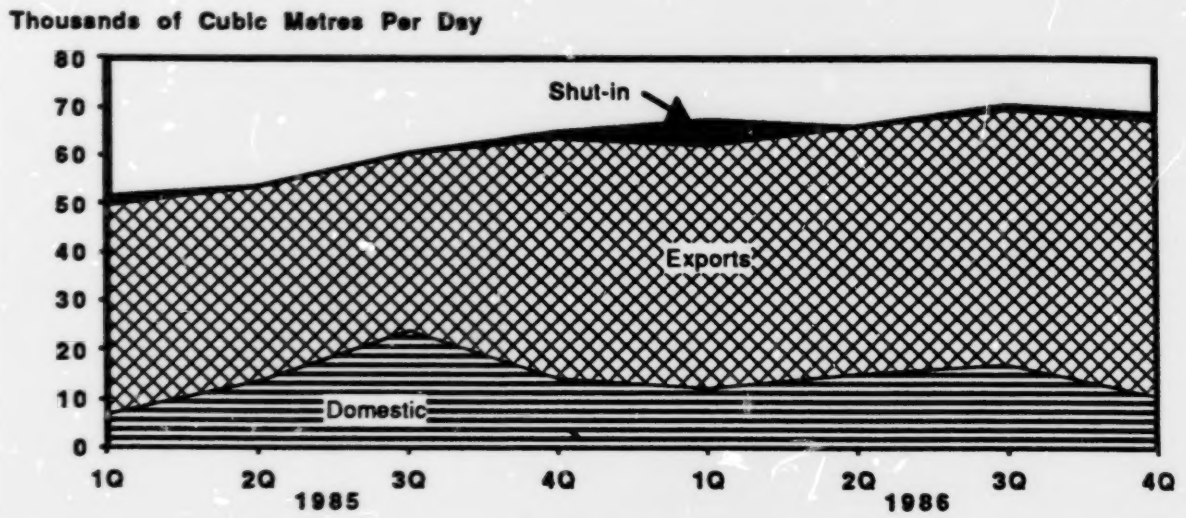
The table on the next page sets out the disposition of western Canadian heavy crude oil in Canada and in the United States during 1985 and 1986.

Export Market

Shipments of heavy crude oil to the export market in 1986 averaged 52.3 $10^3m^3/d$, an increase of 10.3 $10^3m^3/d$ from the previous year. Exports represented about 80 percent of total heavy crude oil production. The U. S. Northern Tier continued its dominance as the primary market for Canadian heavy crude oil with Twin Cities and Chicago absorbing jointly about 82 percent of total exports.



Disposition of Western Canadian Heavy Crude Oil



Disposition of Western Canadian Heavy Crude Oil
($10^3m^3/d$)

	1985	1986
Domestic		
Prairies	4.6	4.4
Ontario	7.9	7.1
Quebec	1.8	1.9
Atlantic	0.3	0.8
Sub Total	**14.6**	**14.2**
Export		
Billings/Laurel, Montana	2.1	4.2
Twin Cities, Minnesota	20.6	23.6
Chicago, Illinois	14.7	19.1
Warren, Pennsylvania	0.3	0.9
Other	4.3	4.5
Sub Total	**42.0**	**52.3**
Total	**56.6**	**66.5**
Shut-In	2.0	1.9

Exports to Montana doubled in 1986 to 4.2 $10^3m^3/d$. December 1985 saw the completion of the Edmonton to Sundre section of the Esso Pipe Line linking Edmonton to the Rangeland pipeline system and facilitating exports of Cold Lake crude oil to Montana.

In order to maximize heavy crude oil production and overcome occasional marketing problems in the Northern Tier, some spot shipments had to be made from Montreal to the U.S. Gulf. One cargo was also loaded in Vancouver for delivery to the far east.

Appendix I provides the details of exports of heavy crude oil by consignee during 1985 and 1986.

Import Volumes

Excluding the volumes imported under processing agreements for re-export, imports of crude oil in 1986 were 46.0 $10^3m^3/d$, about 12 percent above the 1985 level.

In 1982, the federal government introduced the Crude Oil Transfer Program in an effort to reduce the shut-in of crude oil in western Canada by subsidizing the transportation of shipments to refiners east of Montreal. This program ended in June 1985 and, as a result, refiners switched back to foreign crude oil to meet their requirements.

Other factors also contributing to the increase in imports included IPL capacity problems, the competitive pricing of foreign crude oil and the partial relaxation of export controls by the United States. Imports from the U.S. of light sweet crude oil in 1986 were about 3.0 $10^3m^3/d$.

Since deregulation, refiners have purchased the majority of their import requirements from the North Sea. In 1986, receipts from the North Sea represented about 54 percent of the total imports reflecting in part its competitive pricing and proximity to Canada.

The impact of North Sea imports substantially reduced the requirement for feedstocks from Venezuela, Mexico and Africa and, as a result, their percentage of total imports declined. Another factor in the reduced imports from Mexico was the termination of the Canada/Mexico purchase agreement in December 1985. Only a small volume of crude oil was imported from the Middle East in 1986.

The removal of regulatory controls in Canada virtually ended exchange agreements as U.S. refiners were able to obtain their requirements from Canada without hinderance.

Figures 1 and 2 (pages 13 and 14) provide additional detail for 1986 on the disposition of Canadian light and heavy crude oil, including imports, by region in Canada and by U.S. market.

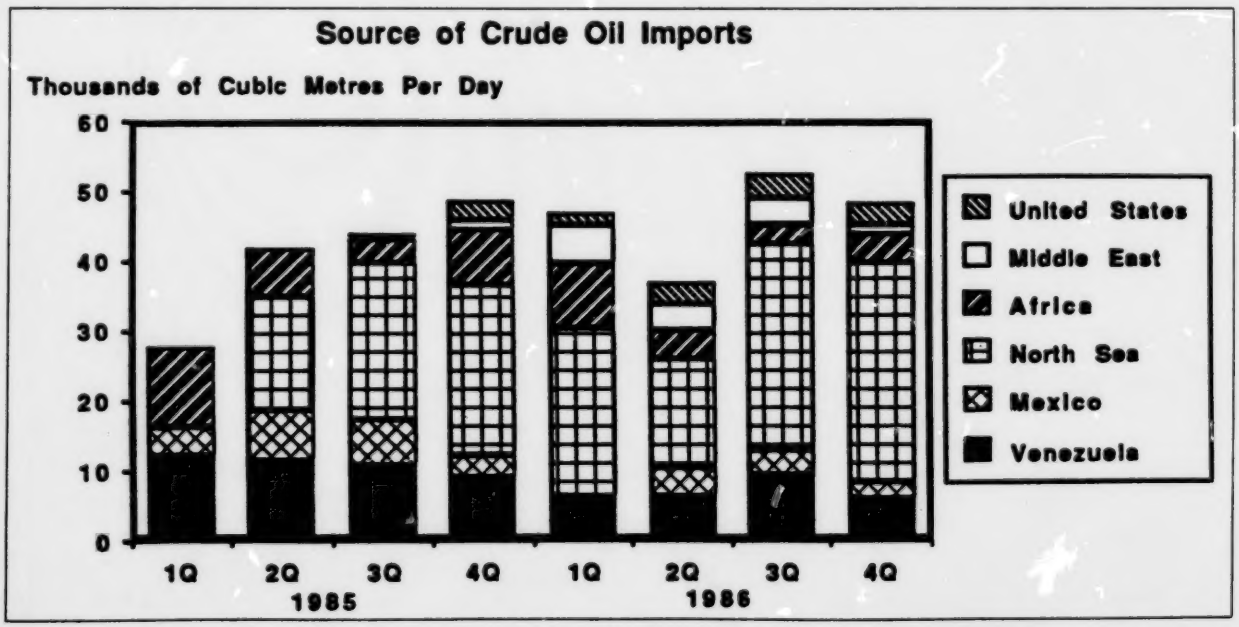


Figure 1
Disposition of Light Crude Oil and Imports into Canada
1986
($10^3m^3/d$)

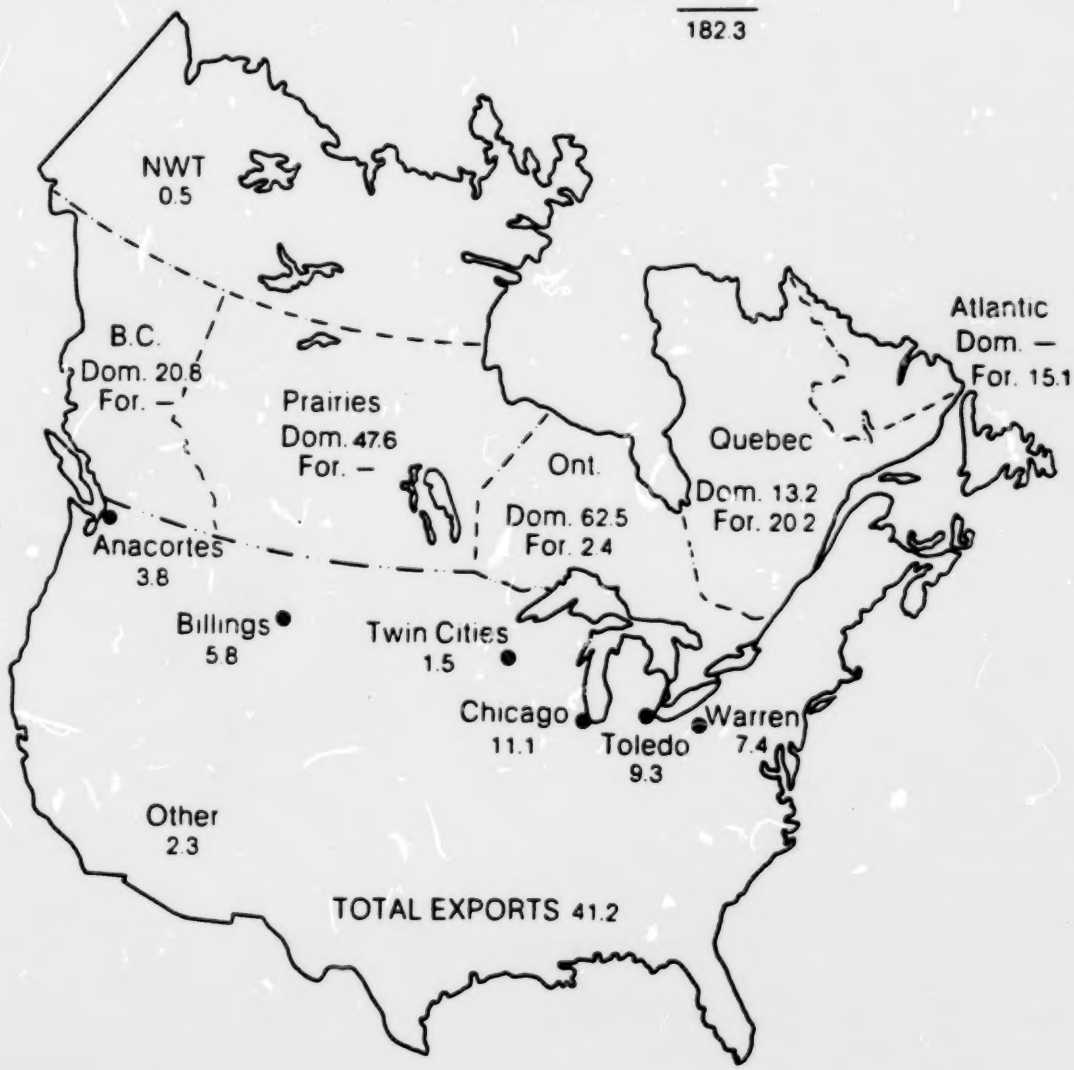


Figure 2
Disposition of Heavy Crude Oil and Imports into Canada
1986
($10^3m^3/d$)

(1) A small volume of heavy crude oil was imported into B.C.

Appendix I

Exports of Canadian Crude Oil by Consignee - 1985 Versus 1986
(m^3/d)

	Light		Heavy		Total	
	1985	1986	1985	1986	1985	1986
Amoco	1 734	1 417	3 223	2 416	4 957	3 833
Ashland	1 439	1 181	709	403	2 148	1 584
Avant	127	-	-	-	127	-
Cenex	526	804	2 001	2 397	2 527	3 201
CGS Energy	-	66	-	-	-	66
Challenger	-	69	-	-	-	69
Cla rk	5 634	5 536	-	250	5 634	5 786
Conoco	2 837	4 296	174	206	3 011	4 502
Crystal	87	64	-	-	87	64
Exxon	867	575	48	1 678	915	2 253
Gladieux	51	-	-	-	51	-
Gotco	-	197	-	-	-	197
Hill	-	1 003	-	-	-	1 003
Koch	913	90	20 08 1	23 182	20 994	23 272
Laketon	-	-	1 174	557	1 174	557
Lyondell	-	117	-	-	-	117
Marathon	228	382	1 6 75	625	1 903	1 007
Mitsui	-	138	-	-	-	138
Mobil	3 135	412	8 262	9 519	11 397	9 931
Montana	-	155	80	-	80	155
Murphy	44	232	899	835	943	1 067
Noco	-	-	423	691	423	691
Phibro	139	271	230	-	369	271
Shell	651	2 021	-	-	651	2 021
Standard	1 247	610	-	-	1 247	610
Sun	2 272	6 132	-	389	2 272	6 521
Texaco	99 3	1 070	-	422	993	1 492
Total	340	264	-	-	340	2 64
T.W. Oil	-	832	-	566	-	1 398
Unocal	1 319	3 303	2 145	7 233	3 464	10 536
United	5 895	7 434	292	887	6 187	8 321
UPG Falco	234	6	-	-	234	6
US Oil	1 296	2 613	46	50	1 342	2 663
Other Consignees	1 408	7	439	7	1 847	14
Total	**33 416**	**41 297**	**41 901**	**52 313**	**75 317**	**93 610**